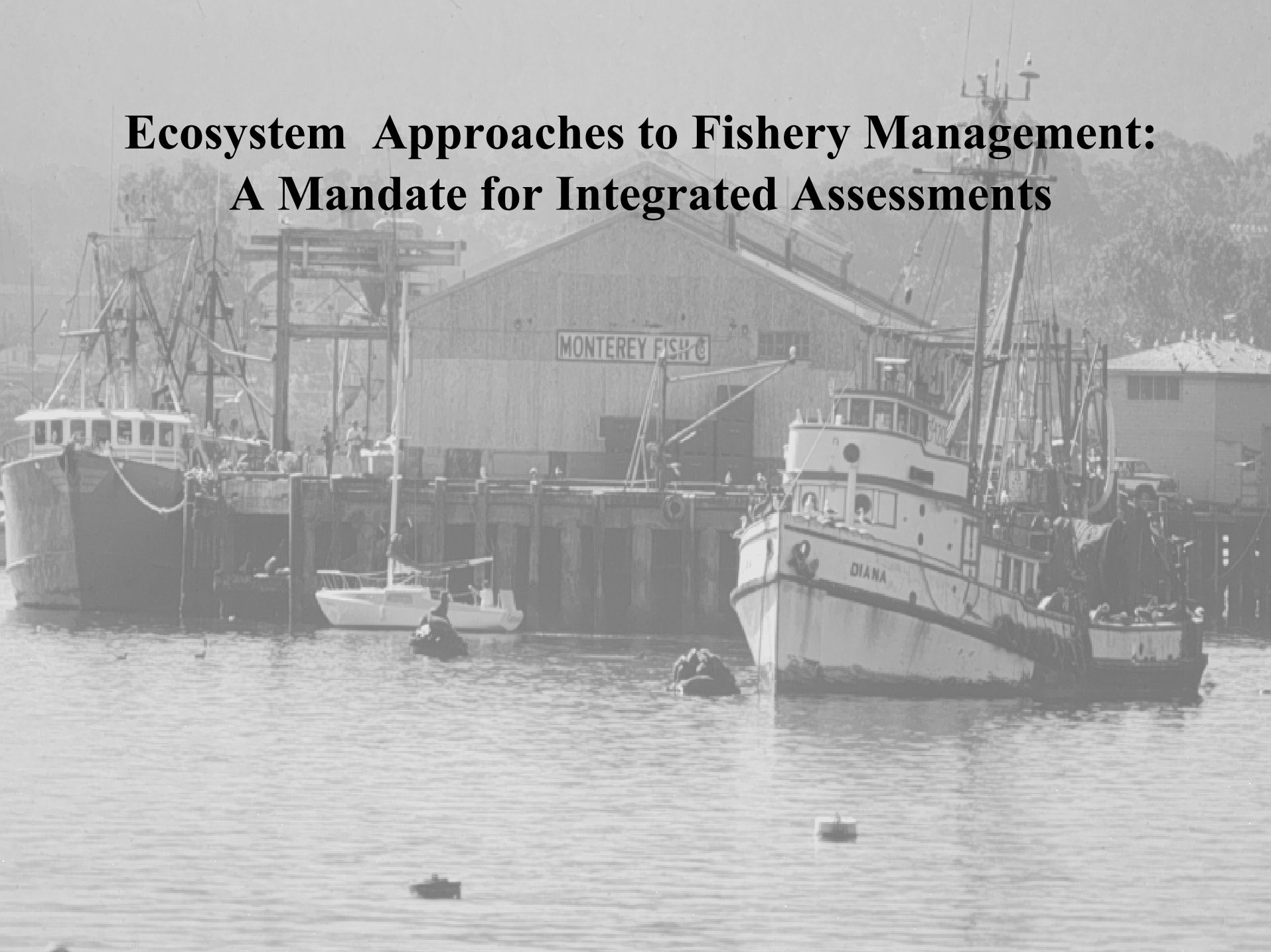
Ecosystem Approaches to Fishery Management: A Mandate for Integrated Assessments



Recreational Economics

Economic Data (includes demographics)

- Stated preference surveys: anglers state preferences for management options
- Trip Expenditures
- Valuation surveys

Models

- Impacts or I/O (contribution to GDP, employment)
- RUM models: (analyze closures, reg changes, changes in environmental quality

Recreational Economics

Implications of Ecosystem Based Approach

- Broader in Scope requires:
  - analyzing more support industries ($ problem)
  - Assessing linkages to other natural ecosystem components (Research question / $ problem)
- Finer in Scale requires:
  - May require improved spatial data ($ /outreach)

Protected Species

- Stated Preference Models
- Defensive expenditure models
- Cost assessments of PR policies on fishermen
- Value all marine protected species (upcoming)

Protected Species

Implications of Ecosystem Approach to Fishery Mgmt

- Broader in Scope requires:
  - Better assessing interactions with fisheries (Research question)
  - Assessing linkages to other natural ecosystem components (Research question / $$ problem)
  - Institutional issues / baggage? (in/outreach problem?)
- Finer in Scale requires:
  - Better understanding of preferred habitats (spatially and temporally) and incorporating this info into model (research question / $$ problem)

Commercial Fisheries

Economic Data

- Core: landings price / revenue;
  input prices, usage (e.g., fuel, bait, labor);
  fixed costs (engines, insurance, drydock)
- Permit, quota lease payments, sales
- Demographic data
- Stated preference surveys (limited)

Models

- Bioeconomic Models
  - Dual (profit, revenue, cost) Models
  - Classic Bioeconomic - Schaefer growth model
  - Rational expectations / option theory /time series models
- Impact Models (contribution to GDP, employment)
- Random Utility Models
- Nonparametric models (DEA, dir. distance fxns)
- Emerging Ecosytem Models: Portfolio theory / general equilibrium / experimental econ / operations research / bayesian

Bioeconomic Models: Dual

Obj. max profit = **py – wx** s.t. **y**=f(**x**) **[**alt. y=f(x; Q)]

Targeting: Catch increases w/ inc own price (elastic)

Bycatch: Catch Species 1 inc. w/ inc. price target

Substitutes: Catch Species 1 dec. w/ inc. price target

Applications: target behavior, bycatch, capital stuffing, ITQs, market power, effort restrictions

Bioeconomic Models: Long Run

Max profit = $\sum_t \mathbf{p}_t \mathbf{y}_t - \sum_t \mathbf{w}_t \mathbf{x}_t$ s.t. $\sum_t \mathbf{y}_t = \sum_t f(\mathbf{x}_t; B_t)$

Long-run decisions: Entry/exit decisions;

Handles problem w/ long time horizons: analyses of rebuilding programs; effects of MPAs, habitat restoration

Models Cont.

- Impact Models
- RUMs:

Ex. Max EU(**py**-costs); **y** uncertain and can depend on environmental factors, stock conditions

- Choose site 1 if EU Site 1>EU Site 2
- Applications: MPAs, spatial heterogeneity

- Nonparametric: primarily capacity estimation; bycatch/modeling “bads”

Commercial Economics

Implications of Ecosystem Based Approach

- Broader in Scope requires:
  - analyzing more support industries ($ problem)
  - Assessing linkages to other natural ecosystem components (Research question / $$ problem)
- Finer in Scale requires:
  - Improved spatial data ($ problem / outreach)
  - Improved Spatial Models (Research question / $ problem)
  - Improved core economic data ($ problem / institutional problem / governance problem)

Sociocultural Research

Data

- Community Profiling (secondary data)
- Ethnographic studies (primary data)

Models

- Qualitative; Decision Tree theory; etc.
- Lack predictive model that integrates w/ other disciplines (in process of developing)

Sociocultural Research

Importance

- Traditional economic models model labor as mobile but generally not true:
  - People are sticky
  - Labor has low salvage value (self-assessment)
- High social costs of stationary stakeholders = High winge (sp?)

Sociocultural Research

Implications of Ecosystem Approach to Fishery Mgmt

- Broader in Scope requires :
  - Profiling non-fishing / non-NS8 communities ($ problem)
  - Assessing linkages to other ecosystem components (Research question / $ problem)
- Finer in Scale requires
  - Better understanding of behavioral motivations and incorporating this info into model (research question / $ problem)

Drivers?

Defn: Fishermen, anglers, public, managers, et al.:

- Economic agents with a past, a present and a future, whose actions are influenced by environmental factors and whose decisions may have both short- and long-term consequences for themselves, others and posterity and are made with incomplete information in an uncertain world with options varying across space.